

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

ENERGY DIVISION

AGENDA ID: 17929
RESOLUTION E-5016
December 19, 2019

R E S O L U T I O N

Resolution E-5016. Rejecting Pacific Gas and Electric Company's, Southern California Edison Company's, and San Diego Gas & Electric Company's Proposal for Standardized Reporting Methodologies to Monitor the Frequency and Amount of Voltage Excursions.

PROPOSED OUTCOME:

- This Resolution rejects Pacific Gas and Electric Company's (PG&E), Southern California Edison Company's (SCE), and San Diego Gas & Electric Company's (SDG&E) Proposal for Standardized Reporting Methodologies to Monitor the Frequency and Amount of Voltage Excursions.
- This Resolution orders PG&E, SCE and SDG&E to confer with the Smart Inverter Working Group and re-submit their proposals in a Tier 1 Advice Letter within 150 days of the issuance of this resolution.

SAFETY CONSIDERATIONS:

- There are no safety considerations.

ESTIMATED COST:

- There are no estimated costs.

By Pacific Gas and Electric Company Advice Letter 5395-E, Southern California Edison Company Advice Letter 3872-E, and San Diego Gas & Electric Company Advice Letter 3283-E filed on October 1, 2018.

SUMMARY

On October 1, 2018, Pacific Gas and Electric Company (PG&E), Southern California Edison Company (SCE), and San Diego Gas & Electric Company (SDG&E), collectively the large investor-owned utilities (large IOUs), submitted Tier 1 Advice Letters (ALs) with their Proposal for Standardized Reporting Methodologies to Monitor the Frequency and Amount of Voltage Excursions as ordered per Resolution E-4898, which was issued on April 26, 2018. Resolution E-4898 ordered the large IOUs to coordinate with the Smart Inverter Working Group (SIWG) to develop appropriate reporting methodologies to estimate the impact of activating the Volt-Watt function of all new smart inverters and to file ALs with proposed reporting methodologies.

This current Resolution rejects the large IOUs ALs because the tools used in the reporting methodology may not be the best tools available, and because there are other reporting methodologies that should be discussed between the SIWG and the large IOUs before the Commission can approve one. The large IOUs are ordered to confer with the SIWG and file a Tier 1 ALs within 150 days of the issuance of this Resolution with updated reporting methodologies. This Resolution also finds it reasonable to adopt a starting date of reporting data 90 days after approval of the updated methodologies required by this Resolution, instead of the three months after the mandatory activation of Function 6 as previously mandated in Resolution E-4898.

BACKGROUND

The California Public Utilities Commission (Commission) initiated Rulemaking (R.) 11-09-011 on September 22, 2011 to review and, if necessary, revise the rules and regulations governing the interconnection of generation and storage facilities to the electric distribution systems of the large IOUs--PG&E, SCE, and SDG&E. The large IOUs' rules and regulations pertaining to the interconnection of generating facilities are set forth in the Electric Rule 21 Tariff. The utilities' distribution grid runs on alternating current (AC). Generating resources that

produce direct current (DC) and wish to interconnect to the utility grid via Rule 21 require an inverter to convert the DC to the AC of the distribution grid.

In early 2013, the SIWG was formed by parties of R.11-09-011 to develop proposals to take advantage of the new, rapidly advancing technical capabilities of inverters. In March 2016, the SIWG completed its first set of recommendations for the Phase 3 Advanced Smart Inverter functions.

On June 23, 2016, the Commission adopted Decision (D.) 16-06-052, which directed the large IOUs to submit ALs proposing revisions to Rule 21 setting forth any agreed-upon technical requirements, testing and certification processes, and effective dates for Phase 3 Smart Inverter functions. On November 17, 2016, the Energy Division hosted a public workshop with the purpose of providing guidance to the large IOUs on the AL submittals.

On December 20, 2016, the large IOUs jointly submitted a Tier 1 AL 4983-E that provided a work plan and an outline of next steps for the development of tariffs that incorporate Phase 3 Smart Inverter functions including a status update on the activities outlined in the work plan by March 30, 2017.

The large IOUs filed the required status update on March 30, 2017. In accordance with the work plan, the large IOUs each anticipated submitting a Tier 3 AL in June 2017. On March 31, 2017, the SIWG submitted final revisions to the Phase 3 recommendations.

On June 27, 2017, the large IOUs were granted a request to extend the submittal date of the Tier 3 ALs to August 18, 2017. On August 18, 2017, PG&E submitted AL 5129-E, SCE submitted AL 3647-E, and SDG&E submitted AL 3106-E, to comply with D.16-06-052 proposing Rule 21 tariff revisions.

On April 27, 2018 the CPUC issued Resolution E-4898 - *Approval, with Modifications, of Request for Modifications to Electric Rule 21 Tariff to Incorporate Smart Inverter Phase 3 Advanced Functions in Compliance with Decision 16-06-052*

PG&E 5395-E, SCE 3872-E, SDG&E 3283-E/jc5

disposing of PG&E's, SCE's and SDG&E's ALs 5129-E, 3647-E, and 3106-E respectively.

Among the key Phase 3 advanced functions of relevance to the advice letters discussed in this Resolution is Function 6 (Volt Watt Mode), which became effective in February 22, 2019. In Resolution E-4898, Volt Watt (and the issues it addresses) is described:

As a general rule, the production of active power raises voltage. This relationship can be problematic when solar photovoltaic (PV) systems interconnect in large numbers on distribution circuits where utilities have not planned for voltage rise and where existing distribution equipment cannot lower voltage. Volt Watt Mode modifies active power from DERs [Distributed Energy Resources] based on predetermined voltage ranges to prevent the local voltage on the distribution circuit from rising/dropping outside of allowable levels. Voltage regulators are a common mitigation measure used on circuits with and without PV to ensure that voltage stays within acceptable levels all the way to the end of the circuit. As PV injects power to the grid at various points along a circuit, the complex interaction of ever-changing load and generation conditions can cause imbalances in voltage levels. These voltage excursions can be mitigated by the smart inverter's Volt Watt Mode [function, which curtails real power and thus mitigates the voltage excursion].

To better understand the amount of real power curtailment resulting from activation of Volt Watt function the Commission ordered the development of standardized reporting methodologies to inform the Commission.

Resolution E-4898 Ordering Paragraph 5 states:

Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric shall work with stakeholders to develop standardized reporting methodologies to monitor the frequency and amount of

voltage excursions and, in consultation with the Commission's Energy Division, shall each file a Tier 1 Advice Letter on the proposed methodologies by October 1, 2018.

Additionally, Resolution E-4898 Ordering Paragraph 6 states:

Pacific Gas and Electric, Southern California Edison, and San Diego Gas & Electric shall each file quarterly reports via Tier 1 information-only Advice Letter for one year starting three months after the mandatory activation of Function 6 on voltage data with the methodologies approved by the Tier 1 Advice Letters from Ordering Paragraph 5, and following the completion of the quarterly reports, shall file annual reports on voltage excursions via Tier 1 information-only Advice Letter. No sooner than five years after the activation of Function 6, the IOUs may file proposals via Tier 2 Advice Letter on whether to continue or modify the reporting requirement.

PG&E's AL 5395-E, SCE's AL 3872-E, and SDG&E's AL 3283-E were submitted to respond to this requirement to develop a monitoring and reporting framework proposal for power curtailment due to the Volt-Watt function of Smart Inverters.

PG&E's AL 5395-E, SCE's AL 3872-E and SDG&E's AL 3283-E

The large IOUs propose to use their respective Voltage Complaint Process to help monitor the frequency and amount of voltage excursions experienced by Distributed Energy Resource (DER) customers who have installed a Smart Inverter with the Volt-Watt function activated. The large IOUs propose to monitor the voltage excursions by estimating the amount of energy reduction due to the activation of the Volt-Watt function. The large IOUs propose to identify and report on voltage issues on the utility side of the meter. The large IOUs propose to utilize Advanced Meter Infrastructure (AMI) data in

conjunction with PVWatts¹ production curves to estimate curtailment. When the results of the investigation reveal that the voltage issues are due to the customer's equipment, the large IOUs propose that they will perform an energy loss calculation for no more than 20 customers per year. Further details can be found in the large IOUs' advice letters Attachment A titled "IOU's Proposed Method to Estimate the Impact of Activating Function 6: Volt/Watt." (Proposed Methodology)

NOTICE

Notice of PG&E's AL 5395-E, SCE's AL 3872-E, and SDG&E's AL 3283-E were made by publication in the Commission's Daily Calendar. The large IOUs state that they served copies of the ALs to the interested parties on the GO-96-B and R.11-09-011 and R.17-07-007 service lists.

PROTESTS/RESPONSES

Sunrun, Inc. (Sunrun) and the Interstate Renewable Energy Council, Inc. (IREC) submitted separate timely protests to the large IOUs' ALs on October 22, 2018. IREC also submitted an alternate Proposed Methodology² as an attachment to its protest to be discussed by the SIWG and "elaborated on before an improved methodology is submitted by the [large] IOUs."

Sunrun recommends the Commission reject the ALs. IREC believes it is premature to approve the proposed methodology because it does not comply with the intent of the Resolution E-4898. IREC asserts that the proposed

¹ PV Watts is an online interactive tool that estimates the energy production and cost of energy of grid-connected photovoltaic (PV) energy systems throughout the world. It allows homeowners, small building owners, installers and manufacturers to easily develop estimates of the performance of potential PV installations. See <https://pvwatts.nrel.gov/>

² See Appendix A of IREC's Protest.

methodologies lack “sufficient detail to ensure that the appropriate voltage data is obtained in compliance” with Resolution E-4898.

PG&E, SCE and SDG&E filed timely, separate, replies to the protests on October 29, 2018.

Sunrun’s Protest and large IOUs’ Replies to Protest

Sunrun argues that what is missing is how the large IOUs will proactively monitor, collect, report on, and respond to voltage excursions from AMI data. Sunrun argues that Resolution E-4898 requires the large IOUs to monitor voltage excursions from two sets of data: (1) the frequency and amount of voltage excursions as determined from AMI data, and (2) the frequency and amount of voltage excursions stemming from the voltage complaint process. Sunrun argues that the Volt-Watt ALs only respond to the latter—that is, that the only trigger for the curtailment assessment will be the customer complaint. Sunrun also argues for a more proactive consumer protection framework.

PG&E Reply: PG&E asserts the approach it has taken is reasonable and provides adequate consumer protection. PG&E states that the Volt-Watt function will not be activated until the voltage is above 6% nominal, and asserts it normally keeps the Point of Common Coupling (PCC) voltage within 5% of nominal so the function will not normally be activated. PG&E states that, according to its Rule 21 Tariff, it is the DERs’ obligation to avoid causing the PCC voltage to go above the 105% of nominal voltage as stated in its Rule 2 tariff.

SCE Reply: SCE states Sunrun’s assertion about the customer protection framework is not accurate. SCE states that Resolution E-4898 ordered the large IOUs to coordinate with the SIWG to develop reporting methodologies, and it has done so. SCE also states that while its AMI captures voltage data, it does not have the tools or processes to be able to scan through billions of data points to determine where voltage issues may have occurred. Hence SCE’s proposed monitoring and reporting methodology relies on the voltage complaint process.

SDG&E Reply: SDG&E states that Resolution E-4898 ordered the large IOUs to coordinate with the SIWG to develop reporting methodologies, and it has done so. SDG&E also states that, to date, the communication systems and protocols to enable direct IOU-to-inverter communications are still unknown, and thus Sunrun's protest is not applicable and should be dismissed. SDG&E argues that the proactive consumer protection framework is outside the scope of the ALs.

IREC's Protest and large IOUs' Replies to Protest

A. Metering Details

IREC argues that the SIWG did not have a chance to fully review each of the large IOUs' AMI capabilities, and that the ALs do not give an explanation of exactly what AMI data would support the reporting methodology. IREC recommends further examination of AMI capabilities before the Commission approves a reporting methodology.

PG&E, SCE and SDG&E Reply: PG&E, SCE and SDG&E state that Figure 1 of the ALs describe that the AMI data will be used to determine a 24 hour, 365 day voltage profile which will allow it to create an hourly voltage profile.

B. Applicability of PVWatts Profiles

IREC questions whether the PVWatts software is appropriate to use, and whether the profile concept will increase or decrease the accuracy of reported results.

PG&E, SCE and SDG&E Reply: The large IOUs assert SIWG participants agreed to use PVWatts in developing PV output profiles for the Integration Capacity Analysis (ICA) and has been accepted as a tool for Rule 21 Working Group 2, thus it should be sufficient for the proposed methodology.

C. Methodology Should be of Sufficient Detail for Customers to Replicate

IREC argues that the methodology used should include sufficient detail so that customers can easily replicate it to allow them to monitor their systems for voltage issues that could result in a complaint.

PG&E Reply: None.

SCE and SDG&E Reply: SCE and SDG&E believe there is sufficient detail in its proposal for customers or developers to understand its methodology.

D. Additional Items to Report

IREC believes there wasn't sufficient discussion among the SIWG to discuss other issues, such as whether any proactive voltage monitoring should be performed by the large IOUs.

PG&E Reply: PG&E states that this issue is beyond the scope of the ALs.

SCE and SDG&E Reply: SCE and SDG&E disagree with IREC and state that the large IOUs coordinated with the SIWG and via direct communications with IREC.

E. Details of Voltage Complaint Process

IREC encourages discussion in the SIWG to standardize the voltage complaint process reporting format in addition to the reporting methodology of the ALs.

PG&E, SCE and SDG&E Reply: The large IOUs states that this issue is beyond the scope of the ALs as it was not ordered by Resolution E-4898.

DISCUSSION

The large IOUs advice letters are rejected. We order the large IOUs to re-submit Tier 1 ALs within 150 days of the issuance of this Resolution. The large IOUs are ordered to hold at least two meetings with the SIWG, or more if Energy Division determines the need for them, before the submittal of the ALs. The first meeting should commence within two weeks of the issuance of this Resolution.

Only the most pertinent issues to the ALs are discussed below. The requirements of the new ALs, as ordered per this Resolution, are also discussed below. We believe that we now have more information and that further discussion with the SIWG will result in a methodology acceptable by all. This Resolution does not alter the requirements of Resolution E-4898, except as discussed below.

PVWatts may not be the best modeling tool available, therefore the large IOUs are ordered to discuss PVWatts and/or other modeling tools with the SIWG.

IREC questions whether the PVWatts is the appropriate tool to use, and whether the profile concept will increase or decrease the accuracy of reported results. We agree. The PVWatts Version 5 Manual³ from 2014 states:

the results should be interpreted as being a representative estimate for a similar actual system operating in a year with typical weather. The errors may be as high as + or - 10% for annual energy totals and + or - 30% for monthly totals for weather data representing long-term historical typical conditions. Actual performance in a specific year may deviate from the long-term average up to + or - 20% from annual and + or - 40% for monthly values.⁴

Furthermore, the manual also states "several more sophisticated tools are available for making more accurate predictions" such as System Advisor Model (SAM),⁵ and PVsyst.^{6,7} The Commission is not making a determination that

³ The current version for PVWatts is Version 6, but there is no manual available for this version.

⁴ PVWatts Version 5 Manual. National Renewable Energy Laboratory (NREL), September 2014. p. 1

⁵ SAM is a free desktop application developed by NREL that allows users to model PV systems in greater detail.

⁶ PVsyst is a commercial software product to model PV systems.

PVWatts is unsuitable, but other options should be explored before making a final decision.

The large IOUs argue that PVWatts should be sufficient because it has been used in other applications, such as the ICA and the Rule 21 Working Group 2. We are not convinced by this argument. The purpose of the ICA is different than the purpose of measuring power curtailment—the ICA is a modeling tool that simulates the ability of distribution circuits to accommodate additional DERs without requiring significant distribution system upgrades, and is only updated once monthly. Furthermore, to date, there has been no data validation of the ICA and hence PVWatts; therefore, to argue that PVWatts should be sufficient is premature. In the power curtailment estimation methodology, we seek, if possible, a more accurate real-time estimation of how much power is curtailed due to the Volt-Watt function of Smart Inverters to determine how this function affects the solar industry and DER owners. With respect to Working Group 2's use of PVWatts, the Commission has not yet ruled on the Working Group 2 recommendations, so we dismiss this argument.

Based on the PVWatts manual, it appears that using PVWatts may introduce more errors into the estimation of power curtailment and not provide the most accurate results available for a particular generating facility. PG&E states it remains open to other models. We therefore order the large IOUs to discuss PVWatts and other modeling tools with the SIWG to determine which is best suited for the estimation of power curtailment for the instant purposes.

The large IOUs are ordered to consider alternate proposed methodologies for quantifying power curtailment and discuss them with the SIWG.

At this moment there are several methodologies proposed, but the Commission does not have enough information to rule on them. The large IOUs proposed methodology was protested. IREC subsequently proposed their own

⁷ PVWatts Version 5 Manual, p. 1-2

methodology when it filed its protest to the ALs, but the large IOUs did not comment on it in the replies to the protest. Given the lack of record, we therefore order the large IOUs to discuss all the methodologies available (e.g., the proposal of the large IOUs and IREC, and other viable options that may arise during further meetings) with the SIWG. In addition, the large IOUs, along with the SIWG, should also consider any other methodologies that are available. For example, the National Renewable Energy Laboratory (NREL), recently made publicly available slides on estimating Volt-Watt curtailment.⁸ The slides propose a method of estimating the DER's energy curtailment using AMI voltage data.

In their re-filing of their proposed methodologies, the large IOUs should elaborate on the specifics of the discussions with the SIWG regarding all the methodologies. The ALs resulting from these discussions should contain the large IOUs proposed methodology, and state if there is consensus on it among the SIWG. The ALs should also describe and evaluate any viable alternate proposals that are discussed by the SIWG. The ALs should list the pros and cons of each methodology, and an assessment of the technical feasibility of each, along with an order of magnitude of cost of each proposal.

The large IOUs are ordered to discuss the types of AMI data and capabilities that are available with the SIWG.

SCE states that its AMI captures voltage data, but it does not have the tools or processes to be able to scan through billions of data points to determine where voltage issues may have occurred, and thus its proposed monitoring and reporting methodology relies on the voltage complaint process to identify parts of the system that have been shown to have voltage issues. While this may be true, we are not asking the large IOUs to look at every generating facility on the

⁸ See <https://www.nrel.gov/docs/fy19osti/74146.pdf>. Lead Author: Anderson Hoke

system, but merely a subgroup—those that have a Smart Inverter with the Volt-Watt function which was only required as of February 22, 2019.

IREC states that “the SIWG did not have a chance to fully review each of the IOUs’ advance metering infrastructure (AMI) capabilities”⁹ by the time the ALs were required to be submitted. Additionally, IREC states that “no formal examination was available to determine if the AMI capabilities could support the reporting methodology in a standardized manner.”¹⁰

We find that the large IOUs have not in the subject ALs, sufficiently discussed the amount of data that would need to be processed, nor the feasibility and costs involved to process the data under various approaches. Therefore, we order the large IOUs to confer with the SIWG available AMI data and capabilities to determine PV power curtailment measurement options, in addition to a first order magnitude of costs involved with each option. To promote transparency, in their ALs the large IOUs should specify what AMI data is available (i.e. instantaneous, average, minimum/maximum) and whether all the large IOUs have the same data available and what data is available for the different customer classes. The ALs should include more specificity on AMI data and monitoring methodologies available, and include methodology for how alarms and/or alerts could be set up to notify the large IOUs of voltage excursions.

Resolution E-4898 Ordering Paragraph 6: Quarterly Reports Requirement

Due to a series of other commitments by Staff (and additional concerns listed below), there was a delay in time since the filing of the ALs and this Resolution. Ordering Paragraph 6 of Resolution E-4898 required the large IOUs to file quarterly reports for one year starting three months after the mandatory activation of Function 6 using the methodologies *approved* by the ALs from

⁹ IREC Protest, p. 2.

¹⁰ IREC Protest, p. 2.

Ordering Paragraph 5—the ALs and methodologies discussed in this Resolution.¹¹

The mandatory activation of Function 6 commenced February 22, 2019. There should have been three reports already filed. Since the methodologies were not approved by that time, there was no approved process in place for the reporting requirements of Ordering Paragraph 6. In order to avoid cost to ratepayers and IOU staff time, we find it reasonable not to approve an interim methodology that would otherwise need to be changed at a later date. Accordingly, we find it reasonable to adopt a starting date of quarterly reporting 90 days after approval of the updated methodologies required by this Resolution, instead of the three months after the mandatory activation of Function 6 as previously stated in Resolution E-4898. Other than the starting date of the quarterly reports, this Resolution does not alter the other requirements of Resolution E-4898.

Additional Concerns

We note a number of areas of concern arising from the process leading to this Resolution. Staff report that their efforts to maintain the Commission's desired schedule were repeatedly frustrated by a lack of cooperation on the large IOUs' part. Initially, IOU representatives failed to respond to Staff communications. For example, the large IOUs did not respond to Staff's June 15, 2018 request for a proposed SIWG meeting schedule to address these issues, delaying the development of a proposal. Additionally, the large IOUs asserted that fewer SIWG meetings were necessary than staff felt necessary to develop the proposal. SIWG members were not provided with information regarding AMI capabilities necessary to evaluate potential alternatives to the large IOUs' proposal. Staff also observes that the proposal contained in the subject Advice Letters does not

¹¹ OP 6 specifically states that each IOU shall "each file quarterly reports via Tier 1 information-only Advice Letter for one year starting three months after the mandatory activation of Function 6 on voltage data with the methodologies approved..."

include the type of robust analysis we ordinarily expect from knowledgeable market participants. The lack of a convincing, viable, well-supported proposal or analysis of options leaves us without the reports that the large IOUs were supposed to have produced by now.

While it remains an open question whether the large IOUs' lack of cooperation in the process leading up to the submission of the subject Advice Letters rises to the level of an express violation of Rule 1.1 of our Rules of Practice and Procedure,¹² the large IOUs did not fulfill the goals set forth for them, and their efforts have been, at best, lethargic. We are disappointed with the large IOUs' halfhearted approach to meeting the Commission's expectations.

COMMENTS

Public Utilities Code section 311(g)(1) provides that this resolution must be served on all parties and subject to at least 30 days public review. Please note that comments are due 20 days from the mailing date of this resolution. Section 311(g)(2) provides that this 30-day review period and 20-day comment period may be reduced or waived upon the stipulation of all parties in the proceeding.

The 30-day review and 20-day comment period for the draft of this resolution were neither waived nor reduced. Accordingly, this draft resolution was mailed to parties for comments, and will be placed on the Commission's agenda no earlier than 30 days from today.

¹² Rule 1.1 states, in part: " Any person who . . . transacts business with the Commission, by such act represents that he or she agrees to comply with the laws of this State, to maintain the respect due to the Commission . . . and never to mislead the Commission or its staff by an artifice or false statement of fact or law."

FINDINGS

1. Resolution E-4898 required PG&E, SCE, and SDG&E to work with stakeholders to develop standardized reporting methodologies to monitor the frequency and amount of voltage excursions and to each file a Tier 1 Advice Letter on the proposed methodologies by October 1, 2018.
2. PG&E's AL 5395-E, SCE's AL 3872-E, and SDG&E's AL 3283-E were submitted to respond to this requirement to develop a monitoring and reporting framework proposal.
3. The large IOUs propose to use their respective Voltage Complaint Process to help monitor the frequency and amount of voltage excursions experienced by DER customers.
4. The large IOUs propose to utilize AMI data in conjunction with PVWatts curves to estimate power curtailment.
5. Sunrun and IREC submitted timely protests to the large IOUs' ALs.
6. Sunrun recommends the Commission reject the ALs. IREC believes it is premature to approve the proposed methodology.
7. It is reasonable to continue discussion of the methodologies, because there are tools other than PVWatts that may be more suited to make more accurate predictions.
8. Other proposed methodologies need to be discussed with the SIWG before the Commission can approve a methodology.
9. AMI data and capabilities need to be discussed with the SIWG to ensure transparency.
10. The requirements of Resolution E-4898 are not altered.

THEREFORE IT IS ORDERED THAT:

1. This Resolution rejects Pacific Gas and Electric Company's Advice Letter 5395-E, Southern California Edison Company's Advice Letter 3872-E, and San Diego Gas & Electric Company's Advice Letter 3283-E.
2. Pacific Gas and Electric Company, Southern California Edison Company, and San Diego Gas & Electric Company are ordered to hold at least two meetings with the Smart Inverter Working Group. Meetings are to commence within two weeks of issuance of this Resolution. Items to discuss include, but are not limited to:
 - i) If PVWatts or other modeling PV tool/profile is best suited;
 - ii) Alternate proposed methodologies (large IOUs, IREC, NREL or others); and
 - iii) What AMI data and capabilities are available to determine PV power curtailment, more specificity on the amount of data that would need to be processed under different monitoring approaches, and the feasibility and costs involved in using alarms and/or alerts in lieu of widespread data processing.
3. The large IOUs are ordered to re-submit Tier 1 Advice Letters, within 150 days, after issuance of this Resolution and after meeting with the Smart Inverter Working Group. The Advice Letters should contain all material discussed in the Discussion section of this Resolution and shall meet all the requirements of Resolution E-4898.
4. The large IOUs shall each file quarterly reports via a Tier 1 information-only Advice Letter for one year starting 90 days after approval of the updated methodologies required by this Resolution.
5. This Resolution does not alter the requirements of Resolution E-4898, except as discussed in the Quarterly Reports Requirement section.

This Resolution is effective today.

I certify that the foregoing resolution was duly introduced, passed and adopted at a conference of the Public Utilities Commission of the State of California held on December 19, 2019; the following Commissioners voting favorably thereon:

ALICE STEBBINS
Executive Director